REMARKS/ARGUMENTS

Request for Continued Examination

The applicant respectfully requests continued examination of the above-indicated application as per 37 CFR 1.114.

Oath/Declaration

It does not identify the foreign application for patent or inventor's certificate on which priority is claimed pursuant to 37 CFR 1.55, and any foreign application having a filing date before that of the application on which priority is claimed, by specifying the application number, country, date, month and year of its filing.

Response:

The certified copy of foreign priority, Taiwan patent application number 091138166 filed 12/31/2002 has been submitted to the examiner on 04/05/2004. The applicant hereby submits the declaration that claims foreign priority benefits under 35 USC 119. Please accept said Taiwan application as a foreign priority, and update the priority information on the PAIR system.

Claim Rejections

Claims 1-16 are rejected under 35 U.S.C. 102(b) as being anticipated

by "Data Mining and Fault Diagnosis Based on Wafer Acceptance Test Data and In-line Manufacturing Data", Fan et al. (referred hereafter Fan et al.).

Referring to claim, 1, Fan et al. disclose a method for analyzing in-line quality control (QC) test parameters (Abstract), the method being used to analyze a plurality of lots of products, each lot of products comprising a lot number, the products being formed using a plurality of equipments, at least one wafer of each lot of products being tested by at least one in-line QC test item to generate an in-line QC test parameter, the in-line QC test item, and its sample test item and wafer test item being stored in a database, the database further storing the in-line QC test parameter and data of a plurality of lots of high-yield product stocks, such as test items and test parameters (page 172, 2nd col., Control Policy Re-evaluation section: lines 1-18, figure 1), the method comprising:

analyzing the in-line QC test parameter to determine whether the in-line QC test parameter corresponds to a predetermined spec or not (page 172, 2nd col., Fab Data Case Study section: lines 1-6);

searching the database to find out the sample test item or the wafer test item related to the in-line QC test item when the in-line QC test parameter does not correspond to the predetermined spec;

searching the database to find out the corresponding test parameters of the high-yield product stocks according to the in-line QC test item and the searched sample test item or the wafer test item (page 172, 2nd col., Fab Data Case Study section: lines 7-15; figure 3); and

generating a correlation to illustrate the relationship between the in-line QC test item and the sample test item, or the relationship between the in-line QC test item and the wafer test item according to the searched

high-yield product stocks (page 172, 2nd col., Fab Data Case Study section: lines 16-18; page 173, 1st col., lines 8-24).

As to claim 2, Fan et al. disclose the method as described above wherein the lots of products are not tested by a sample test process and a wafer test process (page 172, 2nd col., Fab Data Case Study section: lines 16-18; figure 4).

Referring to claim 3, Fan et al. disclose the method as described above wherein the correlation between the in-line QC test item and the sample test item, and the correlation between the in-line QC test item and the wafer test item are generated using linear regression methods (page 172, 1st col., 2nd half, and 2nd col., Fab Data Case Study section: lines 16-18).

As to claim 4, Fan et al. disclose the method as described above further comprising: predicting the sample test result of the lots of products according to the in-line QC test parameter not corresponding to the predetermined spec, and according to the correlation between the in-line QC test item and the sample test item (page 172, 1st col., 2nd half; page 172, 2nd col., lines 1-7, and Fab Case Study section: lines 16-18; figure 4).

Referring to claim 5, Fan et al. disclose the method as described above further comprising: predicting the wafer test result of the lots of products according to the in-line QC test parameter not corresponding to the predetermined spec, and according to the correlation between the in-line QC test item and the wafer test item (page 172, 1st col., 2nd half;

page 172, 2nd col., lines 1-7, and Fab Case Study section: lines 16-18; figure 4).

As to claim 6, Fan et al. disclose the method as described above wherein the database stores data of a process step related to the in-line QC test item, and the method further comprises:

classifying the lots of products into two groups according to a first spec, the two groups of products comprising a qualified group of products corresponding to the first spec, and a failed group of products not corresponding to the first spec;

searching the database to find out the process step related to the in-line QC test item;

finding the equipments used in the process step according to the lot numbers of the two groups of products; and

determining the equipment through which a probability that the failed group of products have passed is higher than a probability that the qualified group of products have passed (page 172, 1st col., Key Node Screening section: lines 1-5).

Referring to claim 7, Fan et al. disclose the method as described above wherein commonality analysis is used to determine the equipment through which a probability that a low-yield group of products have passed is higher than a probability that a high-yield group of products have passed (page 172, 1st col., Key Node Screening section: lines 1-5 and 2nd col., Fab Data Case Study section: lines 7-15).

As to claim 8, Fan et al. disclose the method as described above further comprising: searching test results of each of the sample test items

and each of the in-line QC test items of the lots of products after a sample test process of the lots of products; and generating a correlation between each of the sample test items and each of the in-line QC test items according to the search results (page 172, 2nd col., Control Policy re-evaluation section: lines 1-18).

Referring to claim 9, Fan et al. disclose the method as described above wherein the correlation between each of the sample test items and each of the in-line QC test items is generated by a multiple regression model (page 171, 2nd col., 2nd paragraph).

As to claim 10, Fan et al. disclose the method as described above wherein the correlation between each of the sample test items and each of the in-line QC test items is generated by a stepwise regression model (page 171, 2nd col., 2nd paragraph).

Referring to claim 11, Fan et al. disclose the method as described above wherein the correlation between each of the sample test items and each of the in-line QC test items is illustrated by a residual plot (page 172, 1st col., 2nd half, equation 1, "e_i is a modeling residual").

As to claim 12, Fan et al. disclose the method as described above further comprising:

searching test results of each of the sample test items and each of the in-line QC test items of the lots of products after a sample test process of the lots of products;

classifying the lots of products into a plurality of groups according to the parameters of each of the in-line QC test items of the lots of products

(page 172, 1st col., Device Variation Partition section: lines 1-5, figure 3);

analyzing the sample test parameters of each group of products (page 172, 2nd col., Fab Data Case Study section: lines 1-6); and

analyzing and obtaining the group of products having the sample test parameters most similar to a second spec when the sample test parameters of the groups of products are different (page 172, 2nd col., Fab Data Case Study section: lines 7-15).

Referring to claim 13, Fan et al. disclose the method as described above wherein an ANOVA method is used to analyze whether the sample test parameters of the groups of products are different or not (page 171, 2nd col., 2nd paragraph).

As to claim 14, Fan et al. disclose the method as described above wherein a Duncan's multiple range test is used to analyze and obtain the group of products having the sample test parameters most similar to the predetermined spec (figures 7-9).

Referring to claim 15, Fan et al. disclose the method as described above wherein the classified lots of products are illustrated by a box plot (figure 3).

As to claim 16, Fan et al. disclose the method as described above wherein each of the in-line QC test parameters of the obtained group of products is used as a predetermined spec of the subsequent products (figure 1).

Response:

First, claims 1 and 2 are amended in the above "Amendments to the Claims" section to make the limitation of the step to generate the correlation between the in-line QC test item and the sample test item clearer. Claims 1 and 2 are amended according to Fig. 3 and paragraphs 0029-0037 in the specification of the present application. No new matter is introduced.

Second, the applicant intends to point out the difference between the amended claim 1 of the present application and Fan et al. 's disclosure. The amended claim 1 of the present application is repeated below:

Claim 1 (currently amended): A method for analyzing in-line quality control (QC) test parameters, the method being used to analyze a plurality of lots of products, each lot of products comprising a lot number, the products being formed using a plurality of equipments, at least one wafer of each lot of products being tested by at least one in-line QC test item to generate an in-line QC test parameter, the in-line QC test item, and its related sample test item and wafer test item being stored in a database, the database further storing the in-line QC test parameter and data of a plurality of lots of high-yield product stocks, such as test items and test parameters, the method comprising:

analyzing the in-line QC test parameter of the wafer to determine whether the in-line QC test parameter corresponds to a predetermined spec or not;

searching the database to find out the sample test item or the wafer test item related to the in-line QC test item when the in-line QC test parameter of the wafer does not correspond to the predetermined spec;

searching the database to find out the corresponding test parameters in the sample test item or the wafer test item of the high-yield product stocks according to the in-line QC test item and the searched sample test item or the wafer test item; and

using the in-line QC test parameter of the wafer and the searched test parameters in the sample test item of the high-yield product stocks to generate a correlation to illustrate the relationship between the in-line QC test item and the sample test item and using the in-line QC test parameter of the wafer and the correlation to predict a test parameter for the wafer in the sample test item, or using the in-line QC test parameter of the wafer and the searched test parameters in the wafer test item of the high-yield product stocks to generate a correction to illustrate the relationship between the in-line QC test item and the wafer test item and using the in-line QC test parameter of the wafer and the correlation to predict a test parameter for the wafer in the wafer test item.

As disclosed in the amended claim 1, the present application teaches the inventive concepts of using the in-line QC test parameter of the wafer and the searched test parameters in the sample test item or the wafer test item of the high-yield product stocks to generate a correlation between the in-line QC test item and the sample test item, and <u>using the in-line QC test parameter of the wafer and the correlation to predict a test parameter for the wafer to accept a subsequent test in the sample test item or the wafer test item</u>. For example, the in-line QC test item can be referred to an oxide thickness, and the sample test item can be referred to a capacitance value. In this case, the present invention intends to generate the correlation between the oxide thickness and the capacitance value as the equation (2) disclosed in paragraph 0036, so as to predict the

capacitance value on the wafer before the wafer accepts a real capacitance test.

According to MPEP § 2131, the reference must teach every element in a claim to anticipate the claim, and the section states, "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). >"When a claim covers several structures or compositions, either generically or as alternatives, the claim is deemed anticipated if any of the structures or compositions within the scope of the claim is known in the prior art." *Brown v. 3M*, 265 F.3d 1349, 1351, 60 USPQ2d 1375, 1376 (Fed. Cir. 2001) (claim to a system for setting a computer clock to an offset time to address the Year 2000 (Y2K) problem, applicable to records with year date data in "at least one of two-digit, three-digit, or four-digit" representations, was held anticipated by a system that offsets year dates in only two-digit formats). See also MPEP §2131.02. <"The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an *ipsissimis verbis* test, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

Fan et al. teaches a method of data mining and fault diagnosis based on wafer acceptance test data and in-line manufacturing data, which including to form a decision tree to provide an easy comparison among the equipment effects (Fig. 3, and page 172, 2nd col., section "FAB DATA

CASE STUDY", lines 11-13). In addition, Fan et al. teach the concept of using the "dependency" between the in-line parameters and the extracted equipment effects from LEM to set the reliable in-line SPEC (page 172, 22n col., section "Control Policy Re-evaluation"). However, Fan et al. never mentions any test parameters of high-yield product stocks, nor teaches the concept of generating the correlation between the in-line QC test item and the sample/wafer test item using the in-line QC test parameter and the test parameters in the sample test item or the wafer test item of the high-yield product stocks. Since Fan et al. never expressly nor inherently describes the "dependency" between the in-line parameters and the extracted equipment effects can be the "dependency" between the in-line QC parameters and the test parameters in the sample/wafer test item of the high-yield product stocks, the applicant believes that the reference cannot anticipate the amended claim 1. In addition, Fan et al. never expressly nor inherently describes the concept of using the "dependency" to set the reliable in-line SPEC can be interpreted as using the "dependency" to predict the test parameter for the wafer to accept the subsequent sample/wafer test. The applicant cannot believe "the reliable in-line SPEC" taught by Fan et al. can be equal to a predicted parameter of the present application.

From the aforementioned reasons, the applicant believes that the amended claim 1 is substantially different from the reference cited. Reconsideration of the amended claim 1 is politely requested.

Claims 4 and 5 are canceled and no consideration thereto is required. As claims 2-3, and 6-16 are dependent upon the amended claim 1, they should be allowed if the amended claim 1 is allowed. Reconsideration of

claims 2-3, and 6-16 is therefore requested.

Introduction to New Claims 17-20:

Claim 17 is introduced by merging the claims 1 and 6 and according to Figs. 4-5 and paragraphs 0038-0043 in the specification. Claims 18-20 are introduced according to claims 2-3, and 7, respectively. No new matter is introduced in new claims 17-20.

Claim 17 is added to emphasize the outstanding features of the present invention, including the step of "classifying the lots of products being tested by the in-line QC test item into a qualified group and a failed group" to the step of "determining the equipment through which a probability that the failed group of products have passed is higher than a probability that the qualified group of products have passed". These steps are believed never expressly nor inherently described in the disclosure of Fan et al. Consideration of claim 17 is requested. As claims 18-20 are dependent upon claim 17, they should be allowed if claim 17 is allowed. Consideration of claims 18-20 is therefore requested.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Sincerely yours,

Winston Hsu Date: March 28, 2005

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Note: Please leave a message in my voice mail if you need to talk to me. (The time in D.C. is 13 hours behind the Taiwan time, i.e. 9 AM in D.C. = 10 PM in Taiwan).